Testimony of Dr. Dominick A. DellaSala for March 16, 2022 Hearing on "Fighting Fire with Fire: Evaluating the Role of Forest Management in Reducing Catastrophic Wildfires" in the House Committee on Oversight and Reform, Subcommittee on Environment

I am a survivor of the 2020 Almeda Fire that destroyed half the downtown area of my home town of Talent and nearby Phoenix, Oregon. I bring direct experience living with wildfire and smoke, and speak from my personal and professional background.

Thank you, Chairman Khanna, and members of the Subcommittee, for inviting my testimony.

My main message to you today—The best available science is clearly demonstrating that recent increases in wildfire activity are being driven largely by increased and sustained drought, hot temperatures, and high wind events – this is the new climate "abnormal." We cannot effectively solve for wildfire increases through unmitigated fire suppression or amped up logging across immense landscapes because wildfire increases are influenced by ongoing burning of fossil fuels and land use practices that in turn drive destruction of ill-prepared communities. As this relates to the US Forest Service, their forest management logging practices are contributing to the problem, and are not a solution, as indicating in my testimony and exemplified in the enclosed Exhibit A. Our primary focus should be helping existing communities to become fire-safe. Out in forest wildlands, reintroducing fire safely should be a priority when it is not a threat to communities. If and where thinning occurs, it should be noncommercial, with large fire-resistant and mature trees protected from logging.

I have spent more than than three decades studying forests and publishing peer reviewed research on forests, wildfire, and climate change. I am an author of over 300 publications and books on forest ecosystems, wildfire ecology, and climate change. And I have served as chief and managing editor of several leading scientific journals on forests and climate change, including how to best prepare for wildfires in a rapidly changing climate. Moreover, I served two terms as president of the Society for Conservation Biology, North America Section, whose membership included hundreds of the nation's top conservation and climate change scientists.

In addition to offering my expertise and a diagnosis of the challenge, I am here to offer two primary solutions to the wildfire problem affecting communities:

(1) We must focus the vast majority of resources on helping communities prepare for wildfires through home hardening and clearing defensible space. The top experts tell us these actions will give communities the best chance of surviving extreme wildfires.

(2) In terms of forest management outside of the defensible space zone, all large trees and mature and old-growth forests stands, need to be protected from logging on public forests. That's because these forests and trees are not a fire-hazard priority as they are relatively fire resistant, store the vast majority of carbon, support the highest levels of biodiversity, and provide purified drinking water.

A Personal Lesson in Fire Preparedness and the Need for Community Fire Planning

My home town of Talent Oregon was destroyed in a single day by the unstoppable Almeda Fire that swept through structures, not forests, driven largely by extreme heat, winds, and drought.

At 7 AM on September 8, 2020, I was at my computer writing to my elected officials about the dangerous drought conditions unfolding on the West Coast. A heat dome, camped over the region for months, pushed temperature into triple-digits, plummeted humidity into the single digits, and pulled moisture out of vegetation leaving extremely parched landscapes. I was bracing for an urban wildfire disaster. For years, I had published papers in science journals, testified at hearings, and worked to inform local response to focus on community preparedness, not massive thinning and other forms of logging far away from communities.

One only had to look across the border at what happened in California to see what was possible here in Oregon.

By 10 AM that same day, the Labor Day fires confirmed my greatest fear. Climate change had arrived at my doorstep leaving an indelible mark on Oregon. That day, extreme easterly winds raced across the state. Fires were ignited by power lines, and arson that fanned infernos. The Almeda Fire was sparked in a popular urban park in Ashland, Oregon near the California border. Within hours, the fire traveled 7 miles to my community in Talent, Oregon.

Around 2 PM I fled. Talent and Phoenix were in utter chaos. We had no centralized warning system, planned escape routes, or communications. We only knew how to evacuate from monitoring Facebook sites, police band radios, and neighbors knocking on doors to communicate with the elderly and disabled. That night, I listened from a safe distance to the sounds of exploding propane tanks ripping through trailer parks. The downtown core of Talent was gone in a day, the smoky, apocalyptic conditions lasted for months. The effects will last for lifetimes.

What did we learn? The fire started in grasses that cast wind-carried embers onto homes. Ignited homes then sent more embers to adjacent homes in a domino-like effect, with embers blown sideways from structure to structure in 40-mph wind gusts. All the money and effort that had gone into thinning forests far from the community had no effect. The fire was a weather-climate driven event. The community was ill prepared because all of the focus was on a futile effort to try to alter conditions far from town in the Ashland Watershed.

We lost over 2,700 structures. And while my community is rebuilding, for the most part the rebuilding has not happened with fire-hardened structures.

Development in fire prone areas - known as the Wildland Urban Interface - continues to grow at an alarming pace putting more homes in harm's way. One-third of all homes are in the WUI zone, amounting to as many as 40-million at-risk structures (Radeloff et al. 2018). Researchers have predicted that there will be even more fires in those areas because of human-caused ignitions in the densely populated interface (Radeloff et al. 2018).

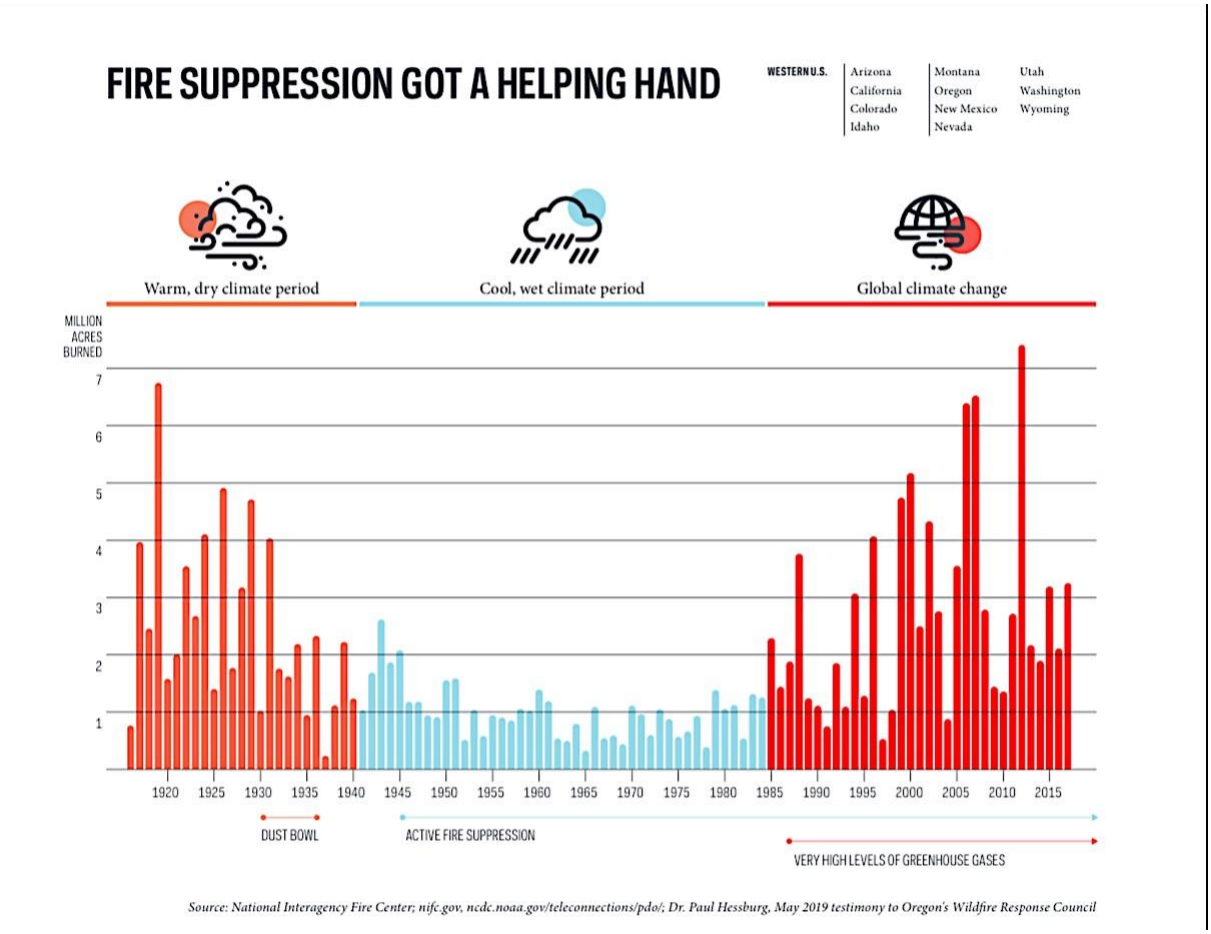
In a comprehensive review of fire risks over a two-decade period, researchers also found that over 80% of all wildfires nationwide in a two-decade period were human caused. The greatest risks were noted in densely populated and roaded areas (Balch et al. 2017). This is why we must focus our energies on preparing homes and surrounding communities, and limiting new development in dangerous, fire-prone areas. We will never be able to fire-proof vast forest and grassland landscapes or control fire behavior in extreme events, which are becoming increasingly prevalent as the climate becomes the main driver of altered fire behavior (Moritz et al. 2014, Abatzoglou and Williams 2016, Schoennagel et al. 2017).

The Root Causes of Wildfire Increases are Greenhouse Gas Emissions from Burning Fossil Fuels and Land Uses

Wildfires are a natural ecosystem process that has shaped the ecology of forest, grass and shrubland ecosystems for millennia, whether ignited by lightning or indigenous burning practices. Many forest communities and wildlife species are uniquely adapted to even the most severe fires that rejuvenate them (DellaSala and Hanson 2015). While fire can destroy homes and communities, it does not destroy forests.

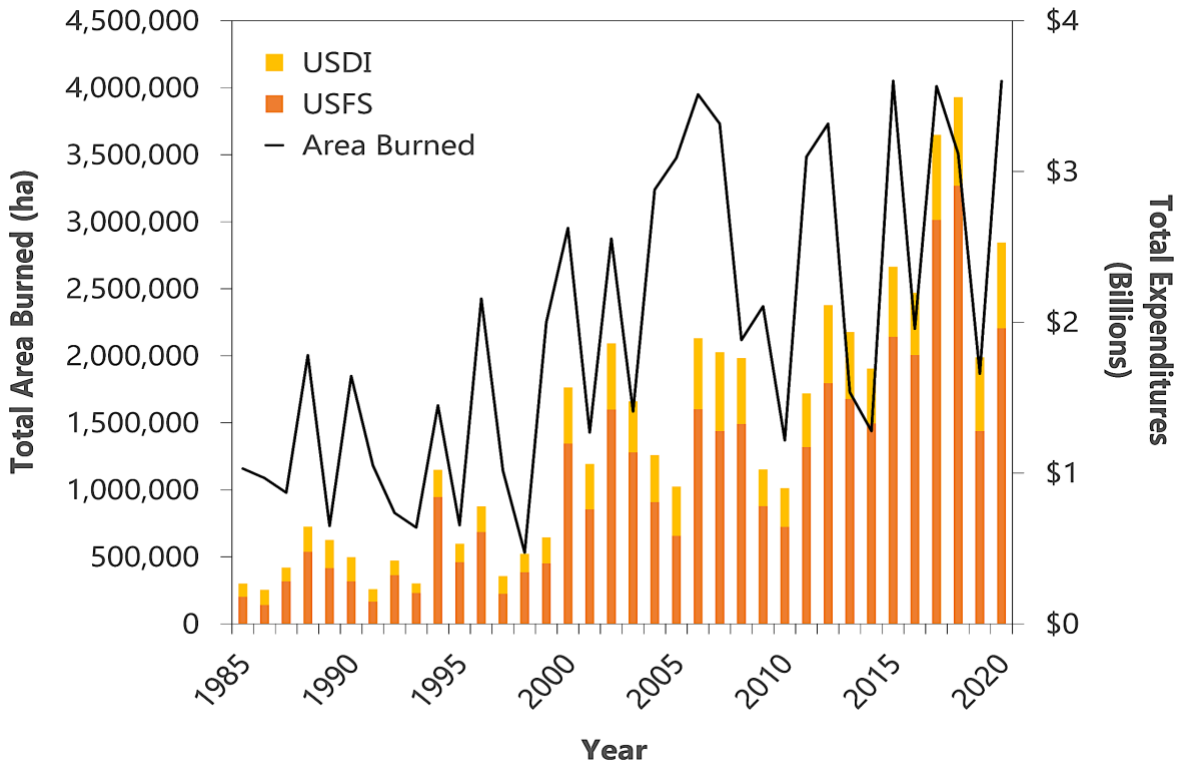
To help shift our approach to fire management, this excellent infographic shows the acres burning across the western US over nearly a century (1926-2017). On the left side of the graph, fire activity was highest during the warm/drought phase of the early part of the prior century. The cool wet climate period depicted in the middle of the graph corresponded with the mid-

century buildup of fire-suppression forces. Our successes during this period created a false sense of security that we could contain fire, paving the way for rapid expansion of more homes built in dangerous places. Around the 1980s (right side), fire activity began to go back up as the climate increasingly over heated. That trend has continued apace and appears to be accelerating.



In sum, the unprecedented amount of greenhouse gas emissions in our atmosphere - which are being emitted by the energy and land-use sectors, including forestry - are driving the changes in temperature, wind and drought. Meanwhile, area burning continues to rise despite unprecedented sums of money being spent on fire suppression as shown in this chart.

Note: hectares = 2.47 acres (this chart is from DellaSala et al. 2022).



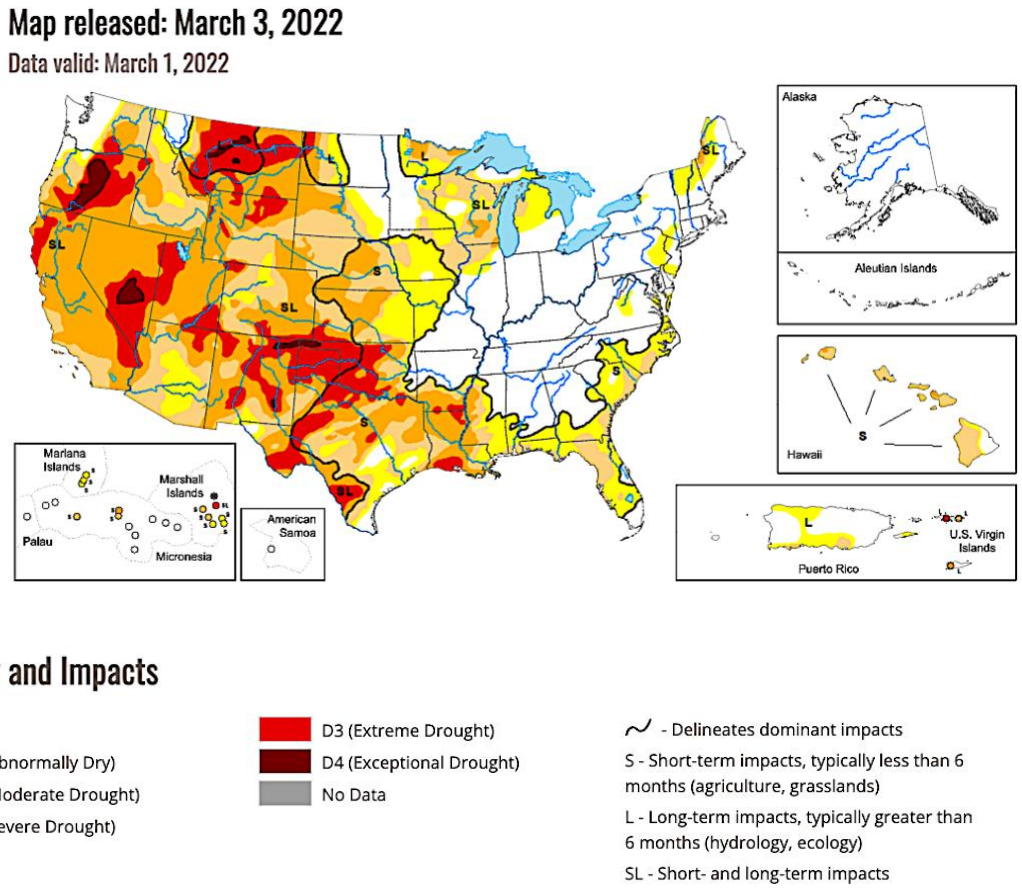
The bottom line - Large wildfires burning under extreme fire weather cannot be stopped by suppression, nor controlled by thinning and other forms of logging over large areas. Yet we have already invested hundreds of millions, if not billions, treating large landscapes. Even scaling up these efforts which is what is happening now, the inescapable truth is that we cannot predict where fire will occur next. Further, grasslands and shrublands burn too. The grasslands fires in Montana, amplified by drought and wind, leveled the town of Denton. The Marshall Fire in Colorado ignited a single shrub in someone's yard; driven by wind, the fire then swept through shrublands (not forests) destroying more than 900 homes.

Drought and Extreme Temperatures Override Local and Landscape Fuel Treatments

Drought cycles are influenced by the interplay between La Nina and El Nino events with their re-occurring cycles determined, in turn, by the global climate. Attempting to moderate fire behavior at the local or landscape level, when large fires are mainly tracking global temperature increases and drought, is becoming increasingly ineffective. We can never spend enough to solve fire problems by thinning and other forms of logging and suppression, as the global climate spins off more "megadroughts" and "heat domes." Just like we cannot stop hurricanes, we cannot stop large fires under extreme conditions known to create their own weather fronts.

If you want to know where we are likely to see big fires, follow the drought and heat maps seasonally published by the National Drought Mitigation Center. The figure below shows several areas currently in extreme (red) and exceptional (brown) droughts. These are likely to continue through fire season and will dictate where suppression forces will most likely be overwhelmed. Note that a substantial portion of the country is in at least abnormally dry conditions (all colors),

so we can expect a very active fire season this year that will challenge firefighting resources regardless of how much money is spent because we are treating the symptoms (more fires) and not the causes (climate change and logging).



Emissions from Wildfires are Not a Major Climate Problem

Among the justifications for removing vegetation on the landscape is to reduce emissions from wildfires. However, there is a substantial and growing body of science that shows that logging before and after fire results in far more carbon released to the atmosphere than the fire itself.

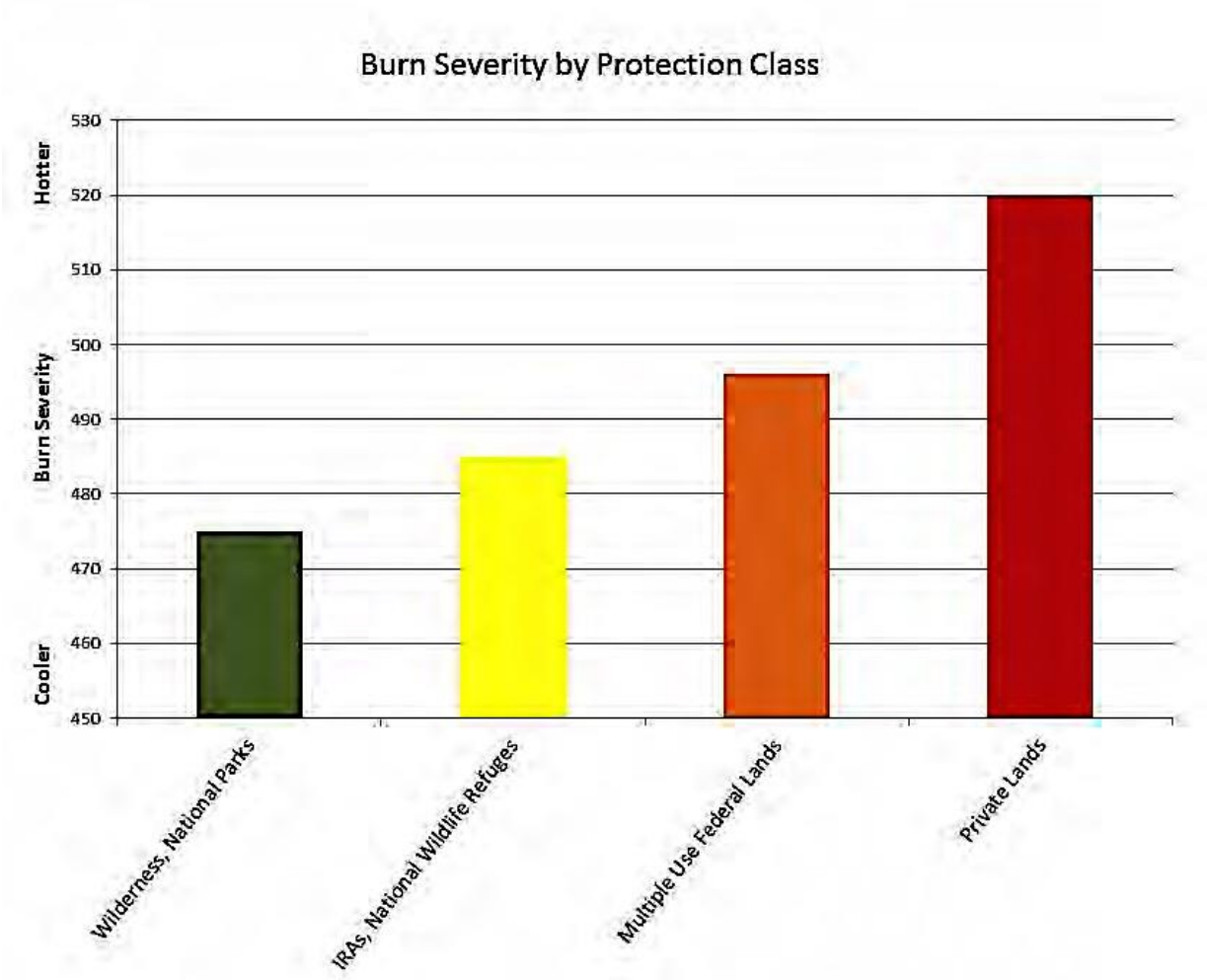
Carbon emissions from logging nationwide from 2006-2010 were ~8 times greater than carbon emissions released from wildfires and insect disturbances combined (Harris et al. 2016). In Oregon, logging emissions eclipsed net carbon exchange from wildfires by five-fold (Law et al. 2018). In a report filed by the Oregon Global Warming Commission (2018) to the Oregon state assembly, logging was recognized as one of Oregon's top carbon polluters.

Logging has recently been reported as a significant source of methane emissions as a result of processing trees at log landings and skid trails that release methane naturally stored in soils (Vantelligen and Thomas 2021a,b). Methane is a much greater contributor to climate change than even carbon dioxide.

Based on extensive field studies over the last four years, Dr. Mark Harmon, emeritus professor at Oregon State University, and his research team (which included myself) recently published a paper directly on point in the peer-reviewed journal, *Forests*. We studied forests that burned in two of California's largest wildfires that affected over 640,000 acres combined, the Rim (2013) and Creek (2020) fires in the Sierra Nevada. We found that these fires were not a significant source of carbon combustion (less than 2% emitted). Nearly all of the carbon present in live, large trees before the fire remained on site regardless of whether the trees were still alive or became snags. Only fine duff, the very smallest trees and understory foliage released most of their carbon. We demonstrated that wildfire emissions reported by the state of California and researchers using models instead of field-based measurements had grossly overestimated the amount of carbon emitted in fires by over 60 times. This study demonstrates that wildfires are not a major source of emissions. In fact, logging over vast areas for the purposes of wildfire mitigation and timber production actually produces far more emissions.

I also want to direct your attention to another study that was published in the peer-reviewed journal, *Ecosphere* in 2016. The team examined 1500 wildfires over a three-decade period across 24 million acres in 11 western states. This is the most comprehensive and statistically robust analysis ever conducted of wildfires and land uses (Bradley et al. 2016). Our team consistently found that logged areas burned at much higher amounts of high severity fire than wilderness, national parks, and roadless areas. Such findings were corroborated by researchers that found a similar pattern in Oregon – the most severe fires were in heavily logged areas that combined with extreme fire weather (Zald and Dunn 2018). Similar findings have been reported in heavily logged areas in Australia's largest wildfires (Lindenmayer et al. 2020).

The right side of this figure shows the preponderance of uncharacteristically severe fires were in areas most heavily managed; not in wilderness, national parks, roadless areas and other protected landscapes as often claimed (left side).



Finally, I want to point out that a recent study by university and Forest Service researchers found that most fires escaping containment and impacting towns/homes originated on private lands, not on public lands. (Downing et al. 2022). The team of researchers concluded: "Cross-boundary fires were primarily caused by humans on private lands." They also went on to say in an accompanying press release that:

> "The Forest Service's new strategy for the wildfire crisis leads with a focus on thinning public lands to prevent wildfire intrusion into communities, which is not fully supported by our work, or the work of many other scientists, as the best way to mitigate community risk," Dr. Chris Dunn, Oregon State University.
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> "A substantial portion of the wildfire problem is a community destruction problem," added Michael Caggiano of Colorado State University. "The Forest Service can contribute to an advisory or facilitation role to address the home ignition zone, including fire resistant design and zoning, and fuels management on private lands, but states, local government and homeowners are better positioned than the USFS to manage those components of wildfire risk."

The researchers noted that "a paradigm shift that could mitigate wildfire risk would begin with the recognition that the significant wildfires occurring in western states is a fire management challenge with a fire management solution, not a forest management problem with a forest management solution."

I wholeheartedly agree with these top experts from the USFS research station and universities. We must focus from the home outward, not from the forest in.

Protect Large, Mature Trees and Mature-Old Growth Forests from Logging

In its Wildfire Crisis Strategy, the Forest Service states that we need a paradigm shift in forest-fire management, yet it then largely proposes to do more of the same thing it has been doing for the last three decades - scale up commercial thinning and other forms of logging and increase fire suppression.

Doing more of the same is running in the wrong direction twice as fast. We need to focus from the home out, and address the root causes of the wildfire problem – greenhouse gas emissions. That also means storing carbon in protected forests, not adding more emissions by logging them.

The top experts tell us we can get there by protecting large trees and mature/old-growth forests from logging before and after fires and other natural disturbances. They have unequivocally told us that we are permanently damaging the ability of our forests to rejuvenate when we post-fire (salvage) log them. And, we are seeing that logging across landscapes is not working to make us safer or to limit fire spread, because it can increase the speed at which fires move through logged areas by reducing the canopy, which in turn dries out and kills natural conifer regeneration, and amplifies reoccurring wildfires due to logging slash build ups (Thompson et al. 2007, Lindenmayer et al. 2008, DellaSala et al. 2022). There is a growing body of evidence that commercial thinning of large, mature trees in frequent-fire forests, which most often occurs on federal lands (see Exhibit A), can increase fire intensity by creating a hotter, drier, and windier microclimate (DellaSala et al. 2022). This is why those trees need to be off limits to commercial thinning and other forms of logging.

Recognizing problems with aggressive thinning as a wildfire mitigation strategy, over 200 climate scientists and ecologists informed Congress in a letter last year (https://bit.ly/3BFtIAg), stating in particular:

> "We have watched as one large wildfire after another has swept through tens of thousands of acres where commercial thinning had previously occurred due to extreme fire weather driven by climate change. Removing trees can alter a forest's microclimate, and can often increase fire intensity. In contrast, forests protected from logging, and those with high carbon biomass and carbon storage, more often burn at equal or lower intensities when fires do occur."

Older forests and large trees store more carbon over the long run and provide habitat for wildlife and drinking water that thinned and logged over areas are most deficient in. These important forest features are also the most fire-resistant and resilient structures that provide natural climate

solutions (DellaSala et al. 2015, Leismester et al. 2021). They are critical to protect for properly functioning terrestrial and aquatic ecosystems (e.g., large trees capture and gradually release purified water essential in a changing climate and buffer communities from storm events). Importantly, our public lands are the best repositories of the most carbon dense forests in the nation, if not the world (DellaSala, manuscript in preparation).

What about dead trees, do they pose a significant wildfire problem? In general, they do not. This is because wildfire naturally thins out the forest and reduces fuels. Dead trees do not pose an appreciable increase in wildfire risk - for example, many comprehensive studies showed large-swaths of beetle-killed forests, when they do burn, did so at lower fire intensities if not logged (Donato et al. 2013, Black et al. 2013, Hart et al. 2015, Meigs et al. 2016, Six et al. 2016). This is why we need more managed wildfires in the back country under safe conditions that can be managed as natural fuel reduction over vast areas. **This does not mean ending suppression – we must protect communities when fire is a risk to them**. **And it does not mean let it burn – rather, fire under safe conditions can be monitored, directed, corralled, back-burned, and fought in the same fire complex depending on threats to communities and natural resource benefits.**

Getting to Coexistence with Wildfires

If there is any hope for fire survivors and communities in the West, it is that an established and growing number of leading scientists (Moritz et al. 2014, Schoennagel et al. 2017, Downing et al. 2021) are recognizing the futility of throwing more money at trying to treat the symptoms of a worsening fire-climate problem. We need to start adapting to more wildfires, while doing everything we can to drastically cut emissions across all sectors in order to avoid worse-case climate scenarios (IPCC 2021, Ripple et al. 2021). Getting to coexistence with wildfires for communities means:

1. Focus on fire risk reduction from the home-outward. First and foremost, hardening homes to reduce the odds they will ignite and ensure new homes are built to withstand fire. And, second, prepare the home-ignition zone by reducing vegetation in a buffer of some 100 feet around structures (Cohen 2000, Syphard et al. 2017). That means getting all levels of government, including the Forest Service, to work with property owners on flammable vegetation management nearest homes and communities. Evaluate and provide incentives to shift development patterns in fire prone areas, and explore effective ways to address powerlines that are responsible for many wildfire starts.

2. Provide assistance for families displaced by fire, many of whom are migrant seasonal workers in need of housing.

3. Oversee and direct the Forest Service to ensure that it is: a) protecting large/mature trees and mature-old growth forests, and post-fire habitats, that store the vast majority of carbon in our forests (Stephenson et al. 2014, Lutz et al. 2018, Mildrexler et al. 2021); and b) focusing vegetation management in areas closest to homes and census-designated communities by reducing flammable understory vegetation and small trees. Seasonal road

closures and some road decommissioning is vital to reduce human-caused wildfire ignitions (see Balch et al. 2017).

4. Provide assistance for a greatly expanded emergency response and early fire warning systems, including stepped up communications, evacuation centers, smoke shelters, better prescribed fire smoke management for at risk populations, planning for displaced communities, and people of color most susceptible to climate change.

5. Make climate change a top priority by reducing emissions from all sectors and storing more carbon in natural ecosystems as a natural climate solution (Moomaw et al. 2019), which means removing less carbon from forests.

Having personally witnessed climate change at my door step, it has been especially troubling to see my community build back, but not better. Real reform can only happen by cutting emissions across all sectors – including forestry – and providing much needed direction and assistance in the rebuilds. Thus, we must redirect wildfire spending to the home-ignition zone and defensible space to save lives and structures. And we must protect from logging the most fire resistant, carbon storing features of our national forests – large trees and mature-old growth forests. Finally, we need to prepare for the worst of climate change that is now at everyone's doorstep, instead of fiddling in forests far away from them.

I welcome questions from the Subcommittee, thank you.

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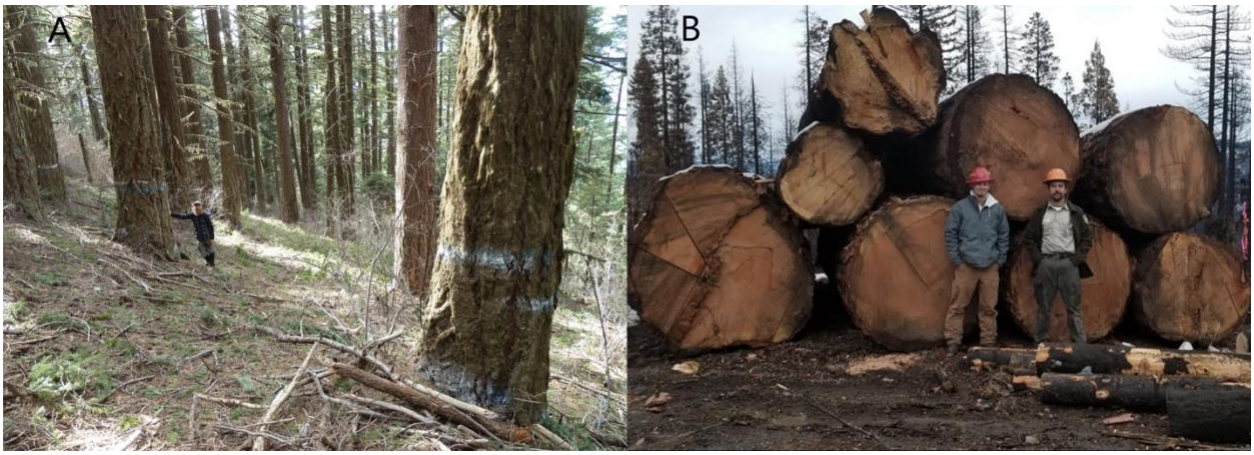
Exhibit A: Forest Thinning and Post-fire Salvage Logging Damages

These actions below singularly or cumulatively can kill natural conifer regeneration, increase fire hazards by leaving flammable slash behind, damage soils, cause invasive weeds to propagate, destroy wildlife habitat, and cause water quality problems from soil damage and excessive road densities needed for access.

Two images below (from DellaSala et al. 2022) show what is typical of "hazardous fuels" and "treatments" for fire risk reduction and "resilience." Photo on the left shows large fire-resistant firs marked (in blue) for removal in a so-called hazard fuels project in the Applegate area, southwest Oregon. Photo B shows postfire logged large trees in response to the Slater Fire, Rogue River-Siskiyou National Forest (L. Ruediger).



These photos below show an older mixed conifer forest in the Santa Fe watershed, New Mexico (left side-A) with heavy thinning just upslope of (right-top, B) ostensibly to reduce flame heights. Photo C (lower right) is of the Southwest Jemez Mountains "Landscape Restoration Project" on the Santa Fe National Forest, NM. Commercial thinning projects like this convert fire-adapted forests to flammable weed infested fields/savannas with heavy soil damages from pile burning (DellaSala et al. 2022). Such projects are typical on federal lands.


A
B
C